

ABSTRACT

Method and apparatus to reduce composite second order (CSO) non-linearity and/or dispersion degradation in multi-wavelength optical communications systems. Optical communication systems using optical fibers are prone to suffer from undesirable distortion due to composite second order distortion caused by self phase modulation, cross phase modulation, and the optical Kerr effect in conjunction with polarization dependence loss. Introduction of a delay (phase shift) between the two optical signals in a dual optical signal system has been found to reduce or suppress the composite second order distortion. The delay shift is provided in either the electrical (RF) mode or in the optical mode. This delay is typically provided in a transmitter or a repeater in an optical system. The typical amount of the delay is half a wavelength of the high frequency RF modulation or for a typical system operating with RF signal up to 550 MHz, one nanosecond of delay. This amount of delay can be provided with approximately a 20 centimeter length of optical fiber in the transmitter. This delay is applied to only one of the two wavelengths, thus providing the desired phase shift.